

BOTSWANA



1. INTRODUCTION

Botswana is a sparsely populated country with a population of just over 1.6 million covering an area of 582,00 sq km. Since independence in 1966 Botswana has performed exceptionally well economically, scoring one of the world's highest economic growth rates which transformed its economy from being one of the poorest countries in the world to a middle-income country with a per capita GDP of \$11,200 in 2006. Two major investment services rank Botswana as the best credit risk in Africa. Diamond mining has fuelled much of the expansion and currently accounts for more than one-third of GDP and for 70-80% of export earnings. Tourism, financial services, subsistence farming, and cattle raising are other key sectors. On the downside, the government must deal with high rates of unemployment and poverty. Unemployment officially was 23.8% in 2004, but unofficial estimates place it closer to 40%. HIV/AIDS infection rates are the second highest in the world and threaten Botswana's impressive economic gains.

Table 1: Basic Economic Indicators, Namibia, 2005

Population (2006)	1,639,833 ¹
Languages	Setswana 78.2%, Kalanga 7.9%, Sekgalagadi 2.8%, English 2.1% (official), other 8.6%, unspecified 0.4% (2001 census) ²
Human Development Index	0.570

The 2002 Index of Economic Freedom, released by the United States-based Heritage Foundation, rates Botswana's economy as the freest in Africa. In both 2001 and 2002, international credit rating agencies Moody's and Standard & Poors, awarded Botswana the highest investment grade sovereign credit rating in Africa. The country was also rated the least corrupt in Africa, by Transparency International's 2002

corruption perception index, as well as the top country in Africa in terms of good governance, by the World Economic Forum in June 2003³.

Botswana is also home to the headquarters of the Southern Africa Development Community (SADC) which is an alliance of 14 countries that exists to meet the region's social, economic as well as political needs, and enable it to speak with a united voice. The effective use of ICT within SADC is currently under consideration.

2. EDUCATION SYSTEM STRUCTURE

Botswana's education system comprises seven years of primary education, three years of junior secondary education, and two years of senior secondary education. Each year at the primary level is a Standard, and each secondary level is a Form.

Education in Botswana is free, but it is not compulsory. The Ministry of Education has authority over all of Botswana's educational structure except the University of Botswana. The educational structure mirrors that of the United Kingdom: there is universal access to primary and junior secondary school, but a process of academic selectivity reduces entrance to the senior secondary school and the university. However, educational curricula incorporate prevocational preparation in the junior and senior secondary schools.

Primary education is the most important stage in the educational system, and the government strives to make this level of education accessible to everyone. One central objective of primary education is for children to be literate first in Setswana and then in English. Other goals are for children to become knowledgeable in mathematics and to have a command of science and social studies. From 1991 to 1997, the number of students completing the primary level and entering junior secondary increased from 65.0 percent to 98.5 percent.⁴

Primary education in Botswana is a joint responsibility between Ministry of Education and that of Local Government.

The minimum entry age is 6 years in public schools and 5 years in private schools and the maximum entry age in public schools is 10 years. However, flexibility is often exercised to enable pupils in the remote areas to have access to primary education. Botswana like all other countries in the world invests heavily on the provision of secondary education. Currently there are 206 Junior Community secondary Schools and 27 Senior Schools.

Botswana also has 6 colleges of education; four of which offer the Diploma in Primary Education while two offer the Diploma in Secondary Education. Botswana also has one university.

Table 2: Education Statistics

Enrolment in Primary Education (% gross)	101(2004)
Enrolment in Secondary Education (% gross)	58(2004)
Transition to Secondary	88(2003)
Enrolment to Tertiary Education (% gross)	6(2004)
Gender Parity Index (GPI)	1.01 in primary; 1.14 in secondary; 1.15 at university(2004)

Botswana has one of the world's highest known rates of HIV/AIDS infection, but also one of Africa's most progressive and comprehensive programs for dealing with the disease. Early in 2002, Botswana became the first African country to offer free Antiretroviral (ARV) therapy to everyone through the public health system.

3. INFRASTRUCTURE

Botswana's ICT infrastructure is very good, but is not fully utilised. Internet usage, for example, stands as low as 5% of the population. There is also considerable disparity in terms of urban and rural access to ICT services. Challenges include the relatively high cost of PCs, the lack of electricity in many rural locations and high telephone bills for Internet usage. In addition, the Internet needs to be made more relevant to the Batswana, through the development of local online content tailored to the needs of the population.

High international bandwidth costs between US\$ 3,250 (satellite) to US\$ 6,000 plus (terrestrial) per 1 MB per month. For 128 kbps, BTC leased lines are between 5 to 20 times more expensive than Namibia and South Africa⁵.

ICT is still not widely exploited by business in Botswana, although it is used extensively in the retail and mining sectors, but almost exclusively within foreign-owned businesses. Botswana's ICT sector itself is small, and generally focused on local market opportunities.

Table 3: ICT Infrastructure Indicators, Botswana 2005⁶

Fixed line subscribers (2004)	69.7 per 1000 persons
Mobile subscribers	708 per 1000persons
Dial-up subscribers (2005)	6,000 (www.afridigital.net)
Broadband subscribers (2004)	0.0
Internet users (2004)	7.167
Television broadcast stations	1
Radio stations	41

Botswana ranks 56th out of 115 countries on the World Economic Forum's Network Readiness Index, ahead of Namibia, Uganda, Mali, Mozambique and Zimbabwe.

The government is still in the process of liberalizing and enhancing regulation of the communications industry in a bid to attract investment as well as encourage innovation and competition. Efforts are being made to reduce communications costs in Botswana, mainly through further liberalization of the telecommunications industry. This should create more competition and ultimately result in lower tariffs for the consumer.

Botswana has a very small IT workforce. A CSO labor survey from 1996 put the total size of the workforce in the country at about one half of one percent of the working population. Of that, only 25% was female. However, Botswana has an English speaking population with an illiteracy rate of about 22.76%⁷.

4. POLICY FRAMEWORK

4.1 Vision 2016

Vision 2016 is a national manifesto of the Botswana Government which articulates the long term economic goals for the country including strategies to meet them. ICT is a key component of the first goal which is to be an educated and informed nation.

The long-term vision is that Botswana will enter the information age on an equal footing with other nations. The country will have sought and acquired the best available information technology, and become a regional leader in the production and dissemination of information.

ICT is also a major focus of the country's economic agenda, National Development Plan 9 (NDP9) and significant investment has recently been made in upgrading Botswana's communications networks to facilitate new technologies. In 2002, Botswana established a government Ministry dedicated to ICT, the Ministry of Communications, Science and Technology.

4.2 Revised National Policy on Education

A Government policy entitled *The Revised National Policy on Education* released in 1994, highlighted the need for all learners to be given computer skills at all levels of schooling in Botswana. It also recommended the introduction of Computer Science as a subject option in Senior Secondary schools and Computer Awareness for the three years of Junior Secondary School. As a result, a new curriculum for Computer Awareness had been developed and piloted in eleven Junior Secondary schools. The curriculum aims to equip learners with computer skills that can be applied in all subjects. A strong focus is also placed on tertiary education, with proposals to increase enrolment at the University of and starting a second university.

4.3 Maitlamo: National ICT Policy | www.maitlamo.gov.bw

The Government of Botswana has recently introduced its national ICT policy called *Maitlamo* which provides a road map to drive social, economic, cultural and political transformation through the effective use of Information and Communications Technology (ICT).

Maitlamo aims to provide a communications network that meets high international standards, and ensure the country has the skills to be an ICT leader. Its key goals are for Botswana to become a sub-Saharan ICT Hub; to create an enabling environment for the growth of an ICT industry in the country and to provide universal service and access to information and communication facilities in the country.

The objectives of Maitlamo are:

- The creation of an enabling environment for the growth of an ICT industry in the country,
- The provision of universal service and access to information and communication facilities in the country, and
- Making Botswana a regional ICT Hub so as to make the country's ICT sector globally competitive

To this effect the following activities are highlighted for implementation:

- Connecting communities programme
- Government-On-Line
- ThutoNet (development of ICT skills in children and young adults)
- e-Health Botswana
- ICT and Economic Diversification
- Connecting Botswana
- Connectivity Laws and Policies

4.3.1 ThutoNet

A critical component of Maitlamo is the policy on the promotion of eLearning which is entitled ThutoNet. The Botswana Government commissioned a study on the network readiness in the learning sector and found:

- A large percentage of schools do not have electricity
- Limited no of computers in schools and limited access to the Internet
- While there are computers in schools there is a limited number ratio of learners to PCs and teachers not trained

ThutoNet targets are:

- The provision of all schools with modern PCs and internet access
- To increase the ratio of PCs to learners to 1:7
- To design and implement an ICT content and curriculum development program for the primary secondary, vocational and tertiary sectors
- To design and implement professional development among teachers

- To develop ICT skills programs for adult learners and non formal learners
- To introduce a strong ICT proficiency measurement and skills monitoring program
- To support e-education research and development
- To secure funding to sustain ICT use in education
- To develop ICT workforce skills in accordance with industry needs

Specific targets include having all schools and libraries with computers and internet connectivity by 31 December 2010; for all teachers to receive ICT training by December 2010; for ICT content to be available at all levels by December 2010 and to achieve the 1:7 PC to learner ratio by 2010. The schools connectivity project is acknowledged as an expensive endeavour. It proposes a 128 kbps Internet connectivity

It proposes a central educational network as an extension of the Government Data Network and that this infrastructure will also support Botswana's Education Management Information System

It also proposes a *Computers for Schools Program* which will

- Increase the ratio for computers to students in schools, extend its reach to the primary level and introduce PCs in the classroom to facilitate ICT throughout the curriculum.
- Govt and private sector organisations donating surplus computers for use in schools and communities.
- The use of recycled PCs will also provide an opportunity for on the job experience for IT graduates working in refurbishment centres.
- School based computer repair workshops

It proposes a *Professional Development Program* which will involve training of a group of teachers who will serve as ICT managers or coaches in their respective schools. An intensive training program focused on basic computer use and maintenance of the use of the Internet and school network and basic ICT education will follow. Later phases will broaden the number of teachers who have basic ICT skills to integrate ICTs into all aspects of the curriculum.

There will also be a range of initiatives aimed at training and job creation for those outside of the formal education system. *JobNet* is a project that will co-ordinate existing programs to create a network of online services and tools aimed at helping employers and job seekers use the internet for recruitment, career, labour information and learning.

4.3.2 Implementation Co-ordination

A Steering Committee for *Maitlamo* has been set up. In addition NELSCOM, a National eLearning Steering Committee has been established to provide a comprehensive report on the strengths and weaknesses of the Botswana's eLearning Strategy.

5. STATUS OF ICT IN EDUCATION INITIATIVES

To date, a host of connectivity and ICT infrastructure projects have been underway. These are outlined in Appendix A.

5.1 Schools Sector

In the formal schools sector, all junior and senior secondary schools have fully equipped computer laboratories.

Botswana has made a commendable effort to provide resources for its junior secondary schools; however, many schools struggle with their effective use. Computers, while available in most schools, often are not equipped with internet connections, precluding their use in cross-curricular instruction. While libraries exist in most schools, they do not have current collections and do not yet operate as vibrant centers of learning⁸.

World Links has played an important role since 2000 in implementing ICTs in Botswana's Community Junior Secondary schools (CJSS) in partnership with the Ministry of Education. These schools are part of the community in terms of their operations and management. They have a board of governors who lay out policies that the school operates within.

The Government has been committed to rolling out 20-PC laboratories including a server and networking to all 205 CJSS'. A computer laboratory was therefore built for each of the schools so that they all have the same sources. This is a facility with air-conditioning, network trunking and a dedicated circuit isolated from the direct mains. By 2002, there were 51 of the 205 laboratories equipped with computers. Out of the equipped schools, 15 were equipped by World Links while the government equipped the rest. All the government equipped schools have 20 computers, with a server and a local area network while the World Links schools still do not have the same complement of equipment. Students involved in the World Links Program were also linked to the collaborative projects of the International Education Resources Network (IERN).

5.1.1 Internet Learning Trust

The Internet Learning Trust, an NGO in the UK, built on the Government project by providing initial training and support for teachers in 11 Community Junior Secondary (CJS) schools identified by the Ministry of Education as suitable pilot models. The project has piloted the use of the Internet for communication and enrichment of curriculum in pilot schools. Twenty-five more CJS schools were equipped in early 2000 and a project memorandum to equip the remaining 169 CJS schools has been completed.

In the case of senior secondary schools, computer labs have been built and most of them are complete and have equipment installed. However, even before proper laboratories were built some senior secondary schools offered Computer Studies as an examinable subject. This subject falls under optional subjects and as such is not done by all students. Computers are also available at education centres and the Department of Non-formal Education (DFNE) offices. These are used for administrative and educational purposes. Most of the private schools in Botswana are connected.

5.1.2 Talk Back TV on HIV/AIDS⁹

Talk Back is a live interactive television programme which forms part of the Teacher Capacity Building for HIV/AIDS Prevention in Botswana. It aims to contribute to breaking down the silence associated with HIV/AIDS in classroom settings, creating opportunity for relevant behavioural change. It further aims to improve teachers' knowledge and skills on interactive methods and HIV/AIDS through the use of distance education and ICT.

It takes the form of a 60 minute interactive television programme, broadcast live and repeated twice a week on Botswana Television. Talk Back allows interactivity between viewers and panelists. This has been greatly enhanced through SMS call-ins during the live broadcast. The use of free communication programmes such as Skype and MSN Messenger are being used to improve viewers discussion and participation. The project has installed television sets, VCRs, decoders and satellite dishes in schools to allow teachers to participate. Further interaction between the programme and the teachers is provided through the country's education centres in the form of in-service workshops and seminars.

The major partners include the Government of Botswana through the Ministry of Finance and Development Planning for execution of the project; the Office of the President (National AIDS Coordinating Agency), Ministry of Local Government and the Ministry of Education, the implementing institution. Talk Back TV Programme is produced by Botswana Television. The United Nations Development Programme (UNDP and UNFIP) and the African Comprehensive HIV/AIDS Partnership (ACHAP) of the Bill & Melinda Gates Foundation, Merck & Co.Inc/The Merck Foundation provide funding and technical assistance in the project.

The project is executed by the Ministry of Education through the Department of Teacher Training & Development.

The provision of Televisions to 61% of Government owned educational institutions has provided the infrastructural base for educational television which has the added potential of being used to address

other development challenges in the areas of environment, Drug control, Life skills education and other social problems. The project is expected to be rolled out to involve private educational institutions and the wider community with involvement of community based and non governmental organizations.

It is expected that by the end of 2007, there will changing values, attitudes and behaviour of youth and adults; that Botswana's educational institutions will have received equipment that can be used in future educational programs; that educators and media professionals in the educational use of television and other ICT media will have had their skills developed; that teachers, education managers and community leaders of Botswana are trained to engage students on socio- cultural and gender issues associated with HIV/AIDS and that educators are aware of effects of the epidemic on their own capacity to function, and of the opportunity to take responsibility for the well being of themselves and others

This project was finalist in the Stockholm Challenge Award in 2002.

5.1.3 Media Centre - Mochudi

The Mochudi Media Centre is a national multimedia centre established to provide ongoing in-service training and support, as well as general media support services to teachers and other educational practitioners. It is the in-service centre for training in video, television, information and communication technology, multimedia programme development, new technologies, research and development. The functions of the Media Centre include

- Formulating training strategies required to develop local capacity necessary for a dynamic and innovative educational media programme.
- Networking all media, ICT services between education and other sectors to ensure comprehensive development of ICT in the country.
- Providing professional development programmes and support to users and producers of educational media and training through strengthening, focusing and extending training programmes in ways which combine education and media skills.

The program includes

- A television studio which is available for the production of education television programmes and professional development of teachers to enhance capacity building as well as the production of videos to be used for teaching and learning.
- An Audio Visual (AV) Van - is fitted with cameras and editing facilities, and it is used as a field production vehicle.
- Computer training facilities are used for training teachers and other educators in computer literacy with emphasis on collaborative learning approaches.

The audio visual training room caters for the training of education practitioners in the effective use of audio-visuals and educational media in teaching and learning. This includes various aspects of multimedia production strategies to enhance instructional delivery.

The Centre is managed by the Ministry of Education

5.2 Higher Education

All government tertiary learning institutions in Botswana are well equipped with Internet-enabled computers. The University of Botswana is the most advanced institution in the country with 6 faculties: business, education, engineering and technology, humanities, science and social science (3). It offers a 2 yr diplomas in computing studies and a 4 yr degree in Computer Science

Botswana is also planning the establishment of a second university which will also be centred on the development of ICT related skills and expertise. World leading programs in science, technology, engineering and business will be at the core of the university's subject offerings.

The country also has a National Institute of Information Technology which offers diplomas and certificates in computing studies.

5.3 Informal

5.3.1 Botswana College of Distance and Open Learning

The adoption of the Revised National Policy of Education led to the creation of Botswana College of Distance and Open Learning (BOCODOL) in 1998. It is a semi-autonomous and statutory organization, set up through an act of parliament. BOCODOL and the Centre for Continuing Education of the University of Botswana, are now the lead agencies in Distance Education and Open Learning. BOCODOL with its Headquarter at Gaborone, has 5 regional centres through which it offers school equivalency courses as well as vocational and management courses. It also has 50 study centres and an enrolment of around 21 000 in 2005. BOCODOL has an e-mail pilot project to improve learner support services through the use of the internet and related services. It also plans to provide basic computer training and internet-based e-mail basics and other software programmes to Open and Distance Learners (ODL). BOCODOL is also considering piloting the International Computer Drivers Licence (ICDL) course in its strategies to become a fully-fledged ODL institute.

Part of the rollout strategy involves the purchase of the Promethean Interactive White Board hardware and software to teach practical subjects. The approach addresses queries involving teaching science subject practicals through simulations. BOCODOL plans to convert print-based instructional materials to interactive CD-ROMS; exploring the development of web-based instructional materials; procurement of video instructional materials to supplement print as well as venture into in-house production of educational videos once the construction of studio facilities is complete.

To boost BOCODOL's efforts, the Ministry of Education in conjunction with the Department of Information Technology (DIT), Ministry of Communications, Science and Technology (MCST) is working on the development. It will also establish an Education Data Network (EDN) which will provide educational institutions with access to internet, e-mail and web-based teaching and learning, throughout the country. This is already being piloted in four institutions through the provision of broadband access to the internet through Botswana Television (Btv) transponders. The ideal is based on gaining discounted rates for bona-fide educational purposes and create a separate super-fast EDN highway for educational use.

MCST is also planning to link Botswana to the western-continental undersea telecommunications cable that will provide high bandwidth to users. BOCODOL stands to gain from this infrastructure through its five regional offices strategically located in Gaborone, Kang, Francistown, Palapye and Maun.

Physical infrastructure for the support of ODL and e-learning include 50 community study centres located within existing secondary schools in the five BOCODOL regions. The 12 Education Centres include the Mochudi Media, Tlokweng National Resource, Learning Resources Centres in the Colleges of Education, secondary schools, computer labs and the campuses and sites of the University of Botswana.¹⁰

5.3.2 Southern Africa Open School Consortium

A number of countries in Southern Africa have established new institutions or divisions within existing institutions to provide secondary education through distance learning. These institutions focus on preparing learners to secure sustainable livelihoods by improving their academic qualifications, and by providing training to create and maintain income-generating opportunities. To share the emerging base of experience in open schooling, the Commonwealth of Learning supported the establishment of an open schools consortium to focus on developing academic and vocational education programs and materials. In July 2006, representatives from institutions and ministries offering education through distance learning in seven African countries met in Gaborone, Botswana to form the Southern African Development Community (SADC) Open Schooling Consortium. Hosted by the SADC Centre for Distance Education (SADC-CDE), the meeting was organised and supported by COL and Mindset Network, a non-profit South African organization. The participants agreed to form the consortium, which will be

housed by SADC-CDE. Mindset will coordinate fundraising and project implementation activities in collaboration with the other members.

The vision of the SADC Open Schooling Consortium is to provide a vehicle to initiate, design and implement collaborative projects to develop high quality distance education programmes (and accompanying materials drawing on different media as appropriate) at a secondary level. The programmes will be designed to secure sustainable livelihoods. The Consortium will facilitate peer-to-peer networking amongst practitioners working to deliver school-level education through open and distance learning (ODL). It will also develop proposals, source funding, and organise and manage joint programme and materials development at two key levels:

- Junior Secondary level - The focus will be on increasing access to quality programmes offered via distance education in order to provide educational opportunities to those large numbers of learners in the region leaving primary education and unable to secure places in the mainstream secondary schooling system.
- Senior Secondary level (learners from age 16-25) - The focus will be on designing high quality programmes that have a strong vocational orientation in order to prepare learners to secure sustainable livelihoods for themselves and their families

6. ENABLING AND CONSTRAINING FACTORS

The table below provides a brief overview of the current stage of development on ICTs in education in Botswana.

Variables	Enabling	Constraining
Policy Framework & Implementation	Botswana has a national ICT policy which incorporates a dedicated section on education with clear ambitious targets to be reached by the end of 2010.	
Advocacy Leadership	Within government there has been dedicated personnel based at its Ministry of Education which attends to all matters relating to ICTs in Education	
Gender Equity re access to ICTs		There are no explicit references to gender equality or women's empowerment in the national ICT policy.
Infrastructure & Access	Botswana has a well developed ICT Infrastructure because of its historical and economic ties with South Africa.	The cost of connectivity remains prohibitive. The government has decided to invest in second hand PCs which may raise sustainability problems in the future.
Collaborating mechanisms	The national ICT policy is co-ordinated by an established steering committee from government representatives across different ministries	
Human Resource Capacity		

Fiscal Resources	Ministry of Education has dedicated financial resources to the rollout of ICTs in school and sought partnerships with other groups and organisations in support.	
Learning content	The national policy shows commitment to the development of local contextually relevant digital learning content.	Whilst there is a stated commitment to develop local content, not much digital content is available that is aligned specifically to Botswana's national curriculum or that is available in local languages.
Procurement regulations		
Attitudes	The leadership within Botswana's government have demonstrated a very positive attitude to the promotion of ICTs in education. Much of the ICT in education programs are based at and led from the Ministry of Education	

Appendix A: Additional Initiatives

National telecommunications network upgrade

Government has committed US\$60 million to rehabilitate and fortify the national telecommunications network. An additional US\$60 million is being mobilised to provide high capacity international connectivity through undersea cables off the east and west coasts of Africa.

Rural telecommunications initiative

At the end of its first phase in 2004, the rural telecommunications initiative brought modern telecommunications, including Internet access capability, for the first time to 147 villages. When fully implemented, the P125 million (125 million Pula) project will ensure that more than 50 percent of Batswana living in the remote areas of the country will be provided with basic telecommunications services. This is a major step forward, which should stimulate economic activity and improve people's lives.

Community information at the touch of a button

Botswana Technology Centre (BOTEC) is piloting a community user information system to bridge the digital divide between rural and urban dwellers. The system comprises an on-line computer network linking three rural communities to Gaborone. The centres provide rural communities with access to Internet-based information and communication services, as well as local information on health, education and business. It will be expanded to include basic services such as downloadable application forms for everything from drivers' licenses to bank loans.

The Centres will also provide small business services and offer basic computer awareness lessons. Following the pilot project, the programme will be rolled out to the rest of the country.

V-Sat technology

Botswana Telecommunications Corporation (BTC) launched V-Sat technology (Very Small Aperture Terminal) which, it is hoped, will play a role in bringing services to remote areas through the use of satellite - overcoming limitations placed on traditional services by vast distances and difficult terrain. The technology will bring significant benefits to the tourism industry, isolated farming communities as well as government and parastatal organisations.

BTC Fibre Optics projects

During 2005, the Gaborone and Francistown metropolitan areas will have extensive fibre networks servicing all business and industrial sectors. In addition, BTC will provide dedicated fibre rings, interconnecting all major buildings in the Gaborone government enclave.

An optical fibre link has been introduced between the southern and eastern corridors of the country between Gaborone and Francistown. Others are planned, bringing high-quality fixed line links to the entire country.

Work is progressing on the introduction of a complete fibre optic 'ring' around the country which will enhance the quality of international connectivity. It is scheduled for completion by 2006.

Connectivity to South Africa has recently been complemented by the 'Tlokweng fibre' allowing BTC to transport traffic from neighbouring countries into South Africa.

Global connectivity is being addressed by shifting primary communication from satellite to fibre-optic systems. A partnership has been established with British Telecom (BT) to hub Internet and packet connectivity into London.

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